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ESTIMATED MINERAL WOOL CAPITAL AND OPERATING COSTS FOR NEW BRUNSWICK, 1979

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OPERATING COSTS FOR NEW BRUNSWICK, 1979

by

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INTRODUCTION

The production of mineral wool (excluding glass wool) in Canada is carried out primarily in Ontario, Manitoba and Alberta. Consequently, mineral wool costs in New Brunswick are higher by approximately 25% due to additional transportation costs. A feasibility study by the New Brunswick Research and Productivity Council indicated that a reasonable estimate of the Maritime market for a mineral wool production facility would be approximately thirty-eight million pounds or one million two hundred and seventy thousand bags (30 pounds). Due to the changing nature of oil costs in New Brunswick which relies heavily on off-shore crude supplies, and the significant differences in construction and engineering costs in Canada, it was deemed appropriate that CANMET carry out additional capital and operating estimates based on the most recent projections for energy, labour and material costs specific to New Brunswick. The calculations were made using the latest U.S.B.M. Capital and Operating Cost Mathematical Model modified to suit the Canadian conditions. Direct capital costs included installed equipment cost, foundations, buildings, structures, instrumentation, and electrical. Indirect costs included field costs, engineering, contingency and contractor's

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fee. Operating costs include raw materials, energy and utilities labour, maintenance and overhead. Miscellaneous operating information such as manpower requirements, electrical horsepower installation, raw material and utility requirements are also included.

Capital Cost

The capital cost estimate for the mineral wool production facility for New Brunswick was predicated on a production capacity of 38,355,000 pounds of annual capacity or 1,278,500 thirty pound bags and appropriate to the first quarter of 1979. The process flowsheet, as shown in Figure 1 and assumed to be employed, included storage hoppers, conveyors, weightometers, feeders, mixers, melting furnace, forming rooms, granulators, trommels and bagging machine. The total installed capital costs as shown in Table 1 is \$4,914,370 (Can \$) with direct costs of \$3,516,420 and indirect costs of \$1,397,950.

Direct Costs

The major direct costs were installed equipment (\$2,002,090), building, foundation and structures (\$965,940) and storage building silos, and cooling tower (\$548,390). Approximately two thirds of the installed equipment cost was made up of three components; melting furnace, compressors and conveyors.

Indirect Costs

Indirect costs were comprised of contingency fund (\$425,490), indirect field costs (\$351,640), contractor's fee (\$235,020) and engineering (\$193,400).

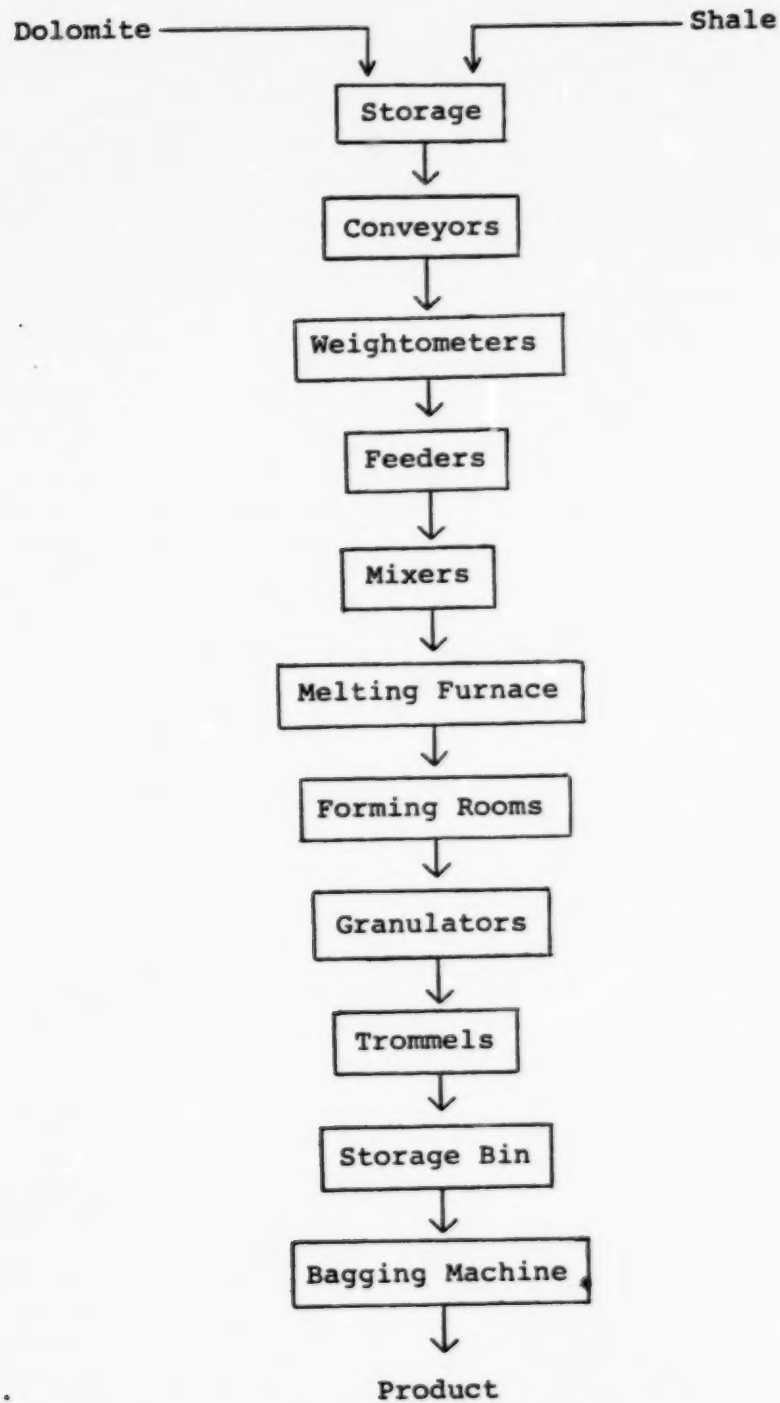


Figure 1. Major Process Equipment Flowsheet

TABLE 1
EQUIPMENT COST SUMMARY, MINERAL WOOL PLANT

ITEM	EQUIPMENT	COST (1) LABOR	TOTAL
HOPPERS.....	\$ 13950	\$ 980	\$ 14930
CONVEYORS.....	381390	95350	476740
WEIGHTOMETER.....	7680	2840	10520
FEEDERS.....	60580	7880	68460
MIXER.....	13270	1990	15260
GLASS-MELTING FURNACE.....	280910	463500	744410
COMPRESSORS.....	412210	61830	474040
FORMING ROOMS.....	2920	1720	4640
GRANULATORS.....	73320	11000	84320
TROMMELS.....	78480	11770	90250
STORAGE BIN.....	10360	730	11090
BAGGING MACHINE.....	2810	420	3230
DUST COLLECTOR.....	3680	520	4200
TOTAL.....	1341560	660530	2002090
STORAGE SILOS.....			(2) 102440
COOLING TOWER.....			(2) 178710
FORKLIFT TRUCK.....			(2) 15450
STORAGE BUILDING.....			(2) 251790
TOTAL EQUIPMENT COST X FACTOR INDICATED:			
FOUNDATIONS, X .300.....			402470
BUILDINGS, X .200.....			268310
STRUCTURES, X .100.....			134160
INSTRUMENTATION, X .010.....			13420
ELECTRICAL, X .010.....			13420
MISCELLANEOUS, X .100.....			134160
TOTAL.....			965940
TOTAL DIRECT COST.....			3516420
FIELD INDIRECT, 10.0 PERCENT OF TOTAL DIRECT COST.....			351640
TOTAL CONSTRUCTION COST.....			3868060
ENGINEERING, 5.0 PERCENT OF TOTAL CONSTRUCTION COST...			193400
ADMINISTRATION AND OVERHEAD, 5.0 PERCENT OF TOTAL CONSTRUCTION COST.....			193400
SUBTOTAL.....			4254860
CONTINGENCY, 10.0 PERCENT OF ABOVE SUBTOTAL.....			425490
SUBTOTAL.....			4680350
CONTRACTOR'S FEE, 5.0 PERCENT OF ABOVE SUBTOTAL.....			234020
SECTION COST.....			4914370

(1) EQUIPMENT COSTS ARE BASED ON THE M AND S INDEX OF 577.0.
(2) INSTALLED COST.

Operating Costs

Operating costs were based on a three-shift, 5-day week, two hundred and fifty day year. Basic operating costs as shown in Table 2 were predicated on the following costs components:

Dolomite & Shale	\$5.40/short ton
Paper Bags	\$0.32 each
Electrical Power	\$0.0255/kwhr
Fuel Oil	\$2.765/10 ⁶ B.T.U.
Labour	\$7.00/hr

Total operating cost was estimated at \$2.215 per thirty-pound bag and included raw materials, energy, labour, maintenance, supplies, plant taxes, insurance and depreciation. The major single cost was fuel oil at 61.4¢ per bag, followed by the bag cost, labour and depreciation. Fuel oil costs accounted for almost 30% of the total operating cost while raw materials (dolomite and shale) only amounted to about 5%.

Operating Factors

<u>Labour</u>	Operators	18
	Supervisors	3
	Maintenance	7
	TOTAL	28

Electrical H.P. Requirements

	<u>H.P.</u>
Conveyors	116.7
Feeders	43.7
Mixer	25.0
Compressors	400.0
Granulators	26.7
Bagging	3.3
Dust Collector	3.3
TOTAL	618.7

TABLE 2

ESTIMATED ANNUAL OPERATING COST*

	ANNUAL COST	COST PER 30LB BAG INSULATING WOOL
DIRECT COST:		
RAW MATERIALS:		
DOLOMITE AND SHALE AT \$.00 PER LB.. \$	148500	\$.116
PAPER BAGS AT \$.32 PER BAG.....	409120	.320
TOTAL.....	557620	.436
UTILITIES:		
ELEC. POWER AT 2.55 CENT PER KWHR.	70450	.055
WATER, PROC. AT 99.00 CENT PER MGAL.	4760	.004
FUEL OIL AT 276.50 CENT PER MMBTU...	784570	.614
TOTAL.....	859780	.673
DIRECT LABOR:		
LABOR AT \$ 7.00 PER HOUR.....	262080	.205
SUPERVISION, 15 PERCENT OF LABOR....	39310	.031
TOTAL.....	301390	.236
PLANT MAINTENANCE:		
LABOR.....	86270	.067
SUPERVISION, 20 PERCENT OF MAINTENANCE LABOR.....	17250	.013
MATERIALS.....	103520	.081
TOTAL.....	207040	.161
PAYROLL OVERHEAD, 35 PERCENT OF ABOVE PAYROLL.....	141720	.111
OPERATING SUPPLIES, 20 PERCENT OF PLANT MAINTENANCE.....	41410	.032
TOTAL DIRECT COST.....	2108960	1.649
INDIRECT COST, 40 PERCENT OF DIRECT LABOR AND MAINTENANCE.....	203370	.159
FIXED COST:		
TAXES, 1.0 PERCENT OF TOTAL PLANT COST	59960	.047
INSURANCE, 1.0 PERCENT OF TOTAL PLANT COST.....	59960	.047
DEPRECIATION, 15 YEAR LIFE.....	399700	.313
TOTAL OPERATING COST.....	2831950	2.215

*Mineral Wool production of 38,500,000 lb/yr = 1,278,500 30-lb bags.

Daily Utility Requirements

Fuel Oil	1135 MM Btu	665 Imp/Gal/day
Water	21,000 Imp Gal/day	
Electricity	11,073 kW.h/day	

CONCLUSIONS

(1) A mineral wool plant cost for installation in New Brunswick was estimated at \$4,914,370 based on the cost index to March 31, 1979.

(2) The total direct operating cost to produce a 30-pound bag of mineral wool was estimated at \$2.215 but does not include the cost of borrowed and working capital.

(3) The most significant operating cost was fuel oil representing almost 30% of total costs. Consequently, fluctuations in the price of fuel oil would have the greatest effect on mineral wool production costs.